Space Weather Forecast

Issued on Saturday 15 February 2025 at 12:30 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor Geomagnetic Storms. Likely Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate solar activity was observed in the last 24 hours, with one Moderate-class flares occurring: from a region in the southeast.

There are currently twelve sunspot regions on the visible disc, of which ten are numbered. There are five notable regions at present, the largest is in the southeast nearing centre disk. This spot has a large central asymmetric spot surrounded by peripheral spots, most of which are small, though one of opposite polarity leading to it's more complex classification. A region in southwest continues to see its intermediate spots fade. A region near south centre disk is a small and apparently unremarkable region, yet has been the source of a number of flares and faint CMEs (coronal mass ejections) on 14 Feb. A small region unusually remains within the southern coronal hole/s, splitting it in two. Finally a region near the SE limb continues to rotate into view, and is rather bright on imagery. All other spots are relatively simple with only little changes observed.

Several faint CMEs were observed leaving the Sun on February 14th, likely originating from AR3990 or AR3994. Additionally, a CME from the northeast of the disc was observed at 15/0107 UTC. There is a chance of glancing impacts between February 16–18 (Days 2–4), although confidence is low.

Solar Wind / Geomagnetic Activity: Solar winds showed an ongoing connection to a fast wind. The solar wind speed was erratic, but showed an overall rise from elevated to strong by the period's end. The Interplanetary Magnetic Field was weak-moderate. The north-south component varied between weakly positive and moderately negative, favouring a negative direction and accentuating geomagnetic activity. The net result of the above solar wind measures was Unsettled to Active geomagnetic activity, with a peak of G1/Minor storm (Kp 5) 15/0900-1200UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Isolated Moderate-class flares are considered Likely.

Solar Wind / Geomagnetic Activity: Several faint coronal mass ejections give a chance of glancing impacts days 2-4 (16-18 Feb). Coronal hole fast winds continue, with a general steady

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trend expected days 1-2 (15-16) Feb, with a slow declining trend thereafter, with speeds peaking around 650 km/s.

Predominantly Unsettled to Active geomagnetic conditions are expected throughout, with a chance of G1/Minor geomagnetic storm (Kp 5) intervals due to coronal hole influences or glancing CMEs. By the end of Day 4 (18 Feb) solar wind speeds and current CME risks are expected to diminish, with geomagnetic activity falling back to Quiet to Unsettled levels (Kp 0-3). The main forecast uncertainty is perhaps the duration of the enhancement, although the peak magnitude is not expected to exceed G1 levels.

Energetic Particles / Solar Radiation: There is a marginally increasing slight chance of a solar radiation storm S1 events given the westward progression of current active regions.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	50	40	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	60	60	60	60
Very Active	R3-R5 (X Class)	No	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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